

Assessing Human Exposures

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Do you live near a landfill, hazardous waste facility, gas station, or other business that may involve the release of hazardous chemicals? Have you ever wondered if perhaps you could be exposed to the chemicals present on that site?

The process of public health assessment (PHA) assists in evaluating whether people are or may be exposed to chemicals released to the environment and also determines whether those exposures result in illness or adverse health effects.

The PHA process is somewhat complex, involving the knowledge of exposure pathways, toxicological information, health outcome data and community concerns. An exposure pathway basically describes how people come in contact with a chemical. There are five major elements to consider when determining exposure pathways:

- 1) point of exposure (where people come in contact with the chemical);
- 2) source of exposure (e.g., smokestack, leaking drums, landfills);
- 3) environmental medium (water, soil, air, etc.);
- 4) exposed population; and
- 5) the route of exposure.

Exposure to chemicals generally occurs through three major routes:

- 1) inhalation,
- 2) dermal (skin) exposure,
- 3) or ingestion.

Periods of exposure (length of time) are also considered. Fifteen days or less is generally known as **acute** exposure. From 15 to 364 days is **intermediate** exposure and 365 days or more is **chronic** exposure. The toxic (poisonous) properties of a chemical along with length of exposure time will determine potential adverse health effects from chemical exposures.

A key factor in the assessment process is the site visit. The health assessor can identify pathways by review of current site conditions, gathering site background information and history, establishing relationships with community members through collection of first hand information and the gathering of environmental data (i.e., sampling).

Here is an example scenario of a site that would undergo the PHA process. A new housing addition was built on a closed landfill. The landfill is producing gases that are moving from the landfill into the air. The residents in the addition are reporting foul odors. Collection of air samples from the area confirms that gases from the landfill are moving into the housing addition, but the report of the analyses performed does not contain information about any contaminant that might be the odor-causing chemical. The information shows that the residents are breathing gases that have moved from the landfill into their neighborhood, but the odor-causing chemical has not been identified.

While this example does demonstrate exposure, it is important to note that proximity to a site (living next door, across the street, within a mile, etc.) does not necessarily mean that someone is adversely affected by it. Many other factors, including the ones mentioned above must first be considered.

Another important issue to note is that everyone is exposed to toxic chemicals around the home. Products such as detergents, household cleaning agents (such as ammonia and bleach), rodent and insect killers, etc. are among the most common. Other home exposures, such as aromatic hydrocarbons in wood smoke and nicotine alkaloids in tobacco smoke are not always immediately obvious.

Much more detailed information on the health assessment process is available for the general public through the Agency for Toxic Substances and Disease Registry (ATSDR) website <http://www.atsdr.cdc.gov/training/public-health-assessment-overview/>, an interactive learning program. Locally, the Environmental Epidemiology Section of the Epidemiology Resource Center at the ISDH can be called toll free at (800) 382-9480.
